Digestate – Note for DGENER – June 2022

Both the Fit-for-55 proposals and the recent REPowerEU communication[1] aim to reduce the European Union's (EU) dependence on imported fossil fuel by accelerating our energy transition. These objectives rely notably on scaling up biomethane, whose production must be increased from 17 to 35 bcm by 2030. The recently published Staff Working Document[2] has outlined several possible actions to achieve this ambitious target, unlocking the full potential of biogas and biomethane across the EU, proposing concrete measures to address the challenges the sector currently faces in Europe.

One challenge, however, has not been addressed by the European Commission (EC): **digestate**, a by-product of anaerobic digestion (AD), which is **currently considered a waste** in most Member States (MS), **despite its high agronomic value and potential for decarbonisation of the agricultural sector**.

Digestate, an obstacle to the production of biomethane

Indeed, all major producers of biomethane and biogas, in Germany, Italy, and France, face the same problem: **digestate management and storage limit production**. Digestate can only be spread on agricultural land authorised by MS' administrations, which is a **bottleneck for a vast majority of European producers**. In France for example, TotalEnergies has a production capacity of 500 GWh/y, but our digestate storage capacities are full, and our land application authorisations insufficient, **so we are forced to slow down production well below our production capacity**

Further increasing biomethane production to unlock our full potential also means increasing digestate production. 40 GWh/y of additional biomethane represents 0.1‰ of the 35 bcm objective. But it generates between 40 to 55 ktonnes of raw digestate per year[3]. This raw digestate contains between 200 to 275[4] tonnes of nitrogen that need to be spread at least over 1,200-1,800 hectares of land[5]. **Reaching the target of 35 bcm therefore requires strong measures to make digestate no longer a limit for biomethane production, but a local and ecological organic fertiliser.**

Local and sustainable fertiliser to ensure food sovereignty and help the ecological transition

In addition to unlocking the production of biomethane, digestate has an underestimated yet invaluable benefit: the **ability to ensure the European Union's food sovereignty and self-sufficiency**. Digestate is in fact a **local and decarbonised organic fertiliser**, which, through its amending qualities, also **helps to regenerate the soil**. For example, two recent studies[6] have shown that the economic and ecological benefits are higher when liquid fraction of digestate is used as a synthetic N substitute.

In 2018, the EU-28 consumed 20 million tonnes of nutrients, of which 3,9 tonnes of **imported mineral nitrogen** (N), i.e., **29% of European consumption**[7]. **Mineral fertilizers** are **energy intensive and rely on natural gas**, mainly imported from Russia for the European domestic production. Moreover, the synthesis of NH_3, based on the Haber-Bosch process is responsible for about 1% of the world's energy

1 COM/2022/108 final
2 COM/2022/230 final
3 The production of 40 GWh/y of biomethane requires between 40-60 k tonnes of feedstocks (1200-1600t/GWh according to our experience in France without energy crops); the AD process transforms 80 to 90% of feedstocks' volume into digestate.
4 1 tonne of raw digestate contains 5 kg of nitrogen (N) (according to our internal technical team).
5 We are here using the ceiling of 170 kg N/ha/y for our assumption.
6 Riva et al., 2016 and Sigurnjak et al., 2019
7 Fertilizers Europe/Eurostat

consumption and **2% of world's global natural gas consumption**[8]; the process is also **responsible for 1.2% of the global anthropogenic CO2 emissions**[9].

Yet Italy produces up to 30 million tonnes of digestate annually which equals to about 400 million euros fossil fertilisers savings[10]. Only TotalEnergies production of biomethane in France by 2030, which will be 3,7 TWh/year (0,35 bcm), will save 133 ktonnes of fertilizers, offsetting 734 ktonnes of CO2 if it replaces synthetic or mineral fertilizers**.**

We have the resources to make the transition to less carbon-intensive, sustainable, and reliable fertilisers, yet we cannot currently optimise this resource as we need to. We understand and share the concerns related to the use of digestate, however, **many scientific studies have shown its agronomic qualities**.

Ensure the health and productivity of our agricultural land

Organic fertilisers such as manure or gross digestate are considered more susceptible to nitrate leaching in the soil, considered one of major impact problem arising from agriculture. **However, studies demonstrate that NH3 emissions are on average lower for digested** than untreated slurry dur to a lower dry matter content; N2O losses are also generally lower. Moreover, **organic matter in digestate can contribute to humus formation**, which is not possible with mineral fertilisers.

The **AD process also reduces pathogen counts when thermophile conditions are adopted**, because of ammonia production and competition for substrate between pathogens and indigenous microflora[11]. **Heavy metals can also be found in digestate, but their contents are in line** with the concentrations of poultry manure, sewage culture and compost.

The sector is aware of the **challenges posed by the recovery of digestated manure and biomass**: the **nutrient variability** in organic fertilisers made from digestate, as well as the presence of **pathogenic microorganisms and heavy metals**. Yet the necessary nutrient recovery from digested manure and biomass across Europe is only viable if there is an effective market for the final products, not being hindered by regulatory European requirements. **The biomethane sector needs visibility and a clear framework to produce organic fertilisers made from their digestate.**

A need for rapid evolution of the regulation on digestate

As one of the major producers of biomethane, we are advocating for the **rapid adoption of a European digestate standard** that will allow the sector to no longer limit their production of biomethane to the production of digestate, while contributing to the greening of the agricultural sector and ensuring European food sovereignty. This standard will have to be **adapted to the particularities of each MS**, with the **aim of greening their fertilisers**, implying the **implementation of strict and frequent controls to avoid any further accidents**.

In this respect, the EC's Joint Research Center (JRC) published a Science for Policy report[12] with the objective to help define harmonised criteria that could allow nitrogen fertilisers derived from digested manure to be used **following identical provisions applied to chemical nitrogen fertilisers**. Yet we are **still waiting** for the results of this report and of the European funded project Systemic.

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[8] Cherkasov et al., 2015
[9] Smith et al., 2020
[10] Italian Biogas Association
[11] Orzi et al. 2015
[12] "*Technical proposals for the safe use of processed manure above the threshold established for Nitrate Vulnerable Zones by the Nitrates Directive"* (91/676/EEC)

In Spain for instance, the recently published “Biogas roadmap to 2030**” foresees the removal of the waste status of digestate**, as well as a possible **introduction of a mandatory quota for the incorporation of organic fertilisers**.

As the implementation of such standard might take some months, we also propose to **extend the measures foreseen by the EC to accelerate permitting** process to digestates, i.e., **to staff administrations issuing land application authorisations and marketing authorisations for fertilising materials produced from digestate, to shorten the delays**. The **FPR** (Fertilising Products Regulation) should also allow the sector to use our digestate as fertiliser products, which is not the case in view of recent developments**, especially for digestate produced from animal co-products**, such as manure, among others. Discussion with DG AGRI to that respect should be intensified, and TotalEnergies would be happy to contribute.

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